Volunteer Lake Assessment Program Individual Lake Reports

WINNISQUAM, LACONIA, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	291,649	**Max. Depth (m):**	53	**Flushing Rate (yr^{-1})**	2.2
Surface Area (Ac.):	4264	**Mean Depth (m):**	15.2	**P Retention Coef:**	
Shore Length (m):	45,400	**Volume (m^3):**	262,306,500	**Elevation (ft):**	482

TROPHIC CLASSIFICATION

Year	Trophic class
1984	OLIGOTROPHIC
1994	OLIGOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

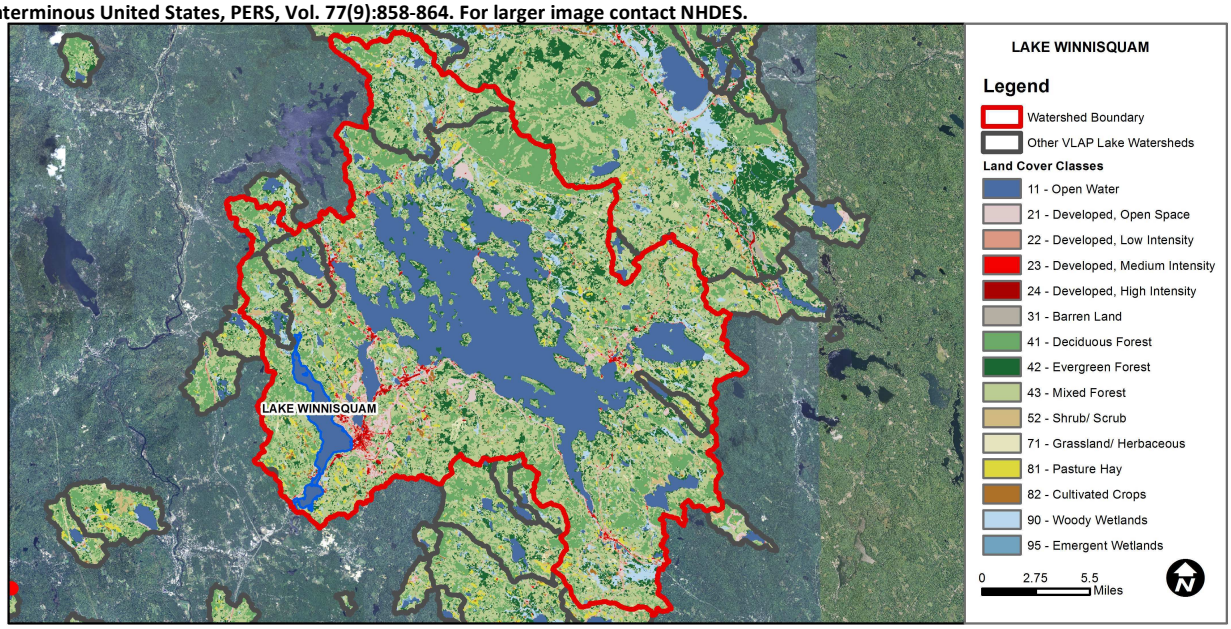
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	<5 samples and median is > threshold. More data needed.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Very Good	At least 10 samples with 0 exceedances of criteria.
	D.O. (% sat)	Very Good	At least 10 samples with 0 exceedances of criteria.
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LAKE WINNISQUAM - AHERN STATE PARK	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.
LAKE WINNISQUAM - BELMONT TOWN BEACH	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
LAKE WINNISQUAM - BELMONT TOWN BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
LAKE WINNISQUAM - BARTLETTS BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.
LAKE WINNISQUAM - BARTLETTS BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
LAKE WINNISQUAM - SANBORNTON TOWN BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.
LAKE WINNISQUAM - SANBORNTON TOWN BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.

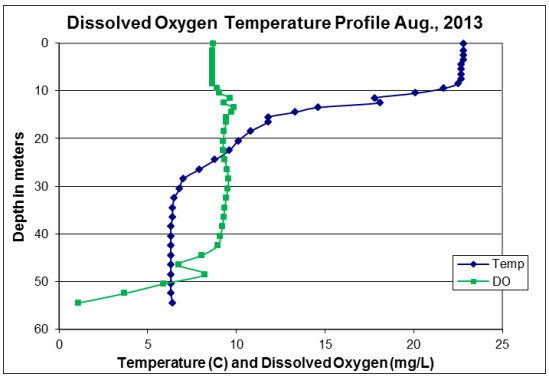


Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	21.4	Barren Land	0.11	Grassland/Herbaceous	0.51
Developed-Open Space	4.8	Deciduous Forest	17.08	Pasture Hay	1.83
Developed-Low Intensity	1.65	Evergreen Forest	11.12	Cultivated Crops	0.52
Developed-Medium Intensity	0.7	Mixed Forest	32.34	Woody Wetlands	3.2
Developed-High Intensity	0.23	Shrub-Scrub	2.67	Emergent Wetlands	0.57

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
WINNISQUAM, POT ISLAND, LACONIA, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels were low in July and August and much less than the state median. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity and chloride were slightly elevated above the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity since monitoring began.
- **TOTAL PHOSPHORUS:** Deep spot phosphorus levels were low and much less than the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus since monitoring began. We hope to see this continue! Black Brook phosphorus levels were elevated in August following a significant storm event of over 0.5 inches of rainfall.
- **TRANSPARENCY:** Transparency measured with the viewscope was much better than transparency measured without the viewscope and was likely a better representation of actual conditions. Historical trend analysis indicates stable transparency with low variability between years.
- **TURBIDITY:** Deep spot and Winnipesaukee River turbidities were low. Black Brook turbidity was slightly elevated in August following a significant storm event.
- **PH:** Deep spot pH levels were within the desirable range 6.5 – 8.0 units however historically have fluctuated below this range. Historical trend analysis indicates stable epilimnetic pH with low variability between years.
- **RECOMMENDED ACTIONS:** Continue to implement and install stormwater best management practices in the Black Brook sub-watershed to reduce nutrient and sediment loading to the lake. The increasing epilimnetic conductivity trend is likely a result of road salt from winter maintenance activities. Encourage local road agents to obtain a NH Voluntary Salt Applicator license through the UNH Technology Transfer Center's Green SnowPro Certification. Keep up the great work!



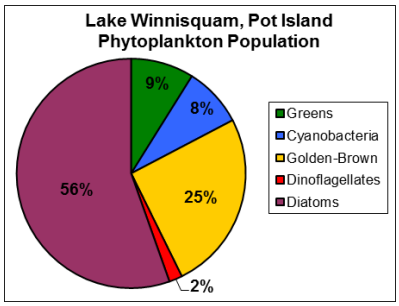


Table 1. 2013 Average Water Quality Data for LAKE WINNISQUAM, POT ISL.

Station	Alk.	Chlor-a	Chloride	Cond.	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	ug/l	m		ntu	
						NVS	VS		
Black Bk			15	95.2	14			1.15	6.76
Epilimnion	7.95	1.92	13	83.7	3	5.69	7.45	0.51	7.04
Hypolimnion				93.1	7			0.43	6.56
Metalimnion				91.9	7			0.51	6.71
Winnipesaukee R			13	81.3	6			0.49	6.92

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Stable	Trend not significant; data show low variability.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
Conductivity	Degrading	Data significantly increasing.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Improving	Data significantly decreasing.